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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CRAIG M. CARPENTER, ROSS S. DANDO,
PHILIP H. CAMPBELL, ALLEN P. MARDIAN,
JEFF N. FUSS and RANDY W. FERCIL

Appeal 2008-0985
Application 09/810,387
Technology Center 1700

Decided: February 14, 2008

Before BRADLEY R. GARRIS, THOMAS A. WALTZ, and KAREN M.
HASTINGS, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-29, 37, 38, 40-44, and 46. We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM-IN-PART and REMAND.

Appellants claim a chemical vapor deposition apparatus comprising a lid 86, and isolation mechanism 88, and an opening 89 (Fig. 1) wherein the isolation mechanism includes a valve 2, 42, and the seat 14, 54 for this valve is within and part of the lid 8, 48 (Figs. 2-3). According to Appellants, "[i]n a typical conventional apparatus, isolation mechanism 88 would not be present and supply line 90 would deliver process chemical 102 directly to chemical opening 89" such that "purging of supply line 90 between supply valve 92 and lid 86 would be common" (Spec. 10; Fig. 1). The presence of isolation mechanism 88 avoids this disadvantage.

Representative claims 1, 44, and 46 read as follows:

1. A chemical vapor deposition apparatus comprising:

a deposition chamber defined by a chamber lid and a chamber body having similar thicknesses, the chamber lid or body having an innermost surface inside the chamber and an outermost surface outside the chamber; and

a valve body having an entirety of a seat within the chamber lid or body thickness between the innermost and outermost surfaces of the chamber lid or body, the seat forming a part of the chamber lid or body.

44. A chemical vapor deposition apparatus comprising:

a deposition chamber defined in part by a cylindrical body and a circular lid matched to a diameter of the cylindrical body;

an opening formed through a thickness of the lid, the opening defining at least a part of a valve seat;

a valve assembly positioned to match a valve plug or diaphragm with the valve seat; and

a distribution showerhead positioned to receive deposition gas from the opening when the valve assembly is in an open position.

46. A chemical vapor deposition apparatus comprising:

a deposition chamber defined in part by a cylindrical body and a single-piece, removable lid with a circumference corresponding to a shape and a size of the body where it joins with the lid, the body size being selected to accommodate a semiconductor wafer during CVD when such wafer is parallel to the lid, the lid having an inner surface inside the chamber and an outer surface outside the chamber and having a thickness which is much less than a width of the lid and which is similar to a thickness of the body, the body and lid thicknesses being selected to accommodate pressures associated with atomic layer deposition;

an opening completely through the lid thickness and defined by sidewalls forming a part of the lid and extending between the inner and outer surfaces, the sidewalls having a shape that of itself defines a valve seat, the entirety of the valve seat being positioned between the inner and outer surfaces; and

a valve assembly positioned to match a valve plug or diaphragm with the valve seat making the lid integral to the valve assembly such that the valve assembly would be incomplete, nonfunctional, or otherwise not able to isolate chemical delivery from reaching the chamber absent the lid.

The references set forth below are relied upon by the Examiner in the § 102 and § 103 rejections before us:

Waterfield	4,319,737	Mar. 16, 1982
Posa	4,747,367	May 31, 1988

Fukui	5,002,928	Mar. 26, 1991
Jeong	5,853,484	Dec. 29, 1998

Claim 44 is rejected under the first paragraph of 35 U.S.C. § 112 "as failing to comply with the enablement requirement" (Ans. 3). In this regard, the Examiner states that "Applicant's [sic] claimed 'showerhead' is not described in the specification" (*id.*). Correspondingly, the Examiner objects under 35 U.S.C. § 132 to the Appellants' amendment, filed April 21, 2005, "because it introduces new matter into the disclosure" (Final Office Action, mailed Mar. 27, 2006, 2). The new matter said to be added by the amendment relates to the aforementioned showerhead.

Claims 41, 42, and 46 are rejected under 35 U.S.C. § 102(b) as being anticipated by, or alternatively under 35 U.S.C. § 103(a) as being unpatentable over, Posa.

Claim 43 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Posa in view of Fukui.

Claims 1, 2, 4-23, 25-29, and 46 are rejected under 35 U.S.C. § 102(b) as being anticipated by, or alternatively under 35 U.S.C. § 103(a) as being unpatentable over, Fukui.

Under 35 U.S.C. § 103(a): claims 3, 37, 38, and 40 are rejected as being unpatentable over Fukui; claim 24 is rejected as being unpatentable over Fukui in view of Waterfield; and claim 44 is rejected as being unpatentable over Fukui in view of Jeong.

In the arguments advanced against these rejections, Appellants have not separately argued with any reasonable specificity any of the dependent claims including the separately rejected dependent claims. Like Appellants, we will focus on the independent claims only in assessing the merits of these rejections.

For the reasons which follow, we cannot sustain the § 102 and § 103 rejections of claims 1, 2, and 4-8 over Fukui or the § 103 rejection of claims 3 and 37 over Fukui or the § 103 rejection of claim 44 over Fukui in view of Jeong. However, we will sustain each of the other above-noted rejections before us in this appeal.

The § 112, first paragraph, rejection

As reflected by the Examiner's afore-quoted comments, claim 44 is rejected as failing to comply with the enablement requirement, and yet the basis for this rejection is said to be that the claimed "showerhead" is not described in the Specification. In formulating this rejection, therefore, the Examiner has intermingled aspects of the enablement and written description requirements set forth in the first paragraph of § 112. By way of clarification, these requirements are separate and distinct. *Vas Cath, Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991). It follows that issues raised by the written description and enablement requirements should be separately addressed in separate rejections. Nevertheless, the Examiner's failure to do so in this instance is harmless error for the reasons expressed below.

Concerning the issue of enablement, Appellants argue that distribution showerheads in CVD (i.e., chemical vapor deposition) apparatus are known in the prior art to those with ordinary skill as evinced by Jeong (US Patent No. 5,853,484) and Carpenter et al. (US Patent Application Publication 2004/0083959 A1).¹ Accordingly, it is Appellants' position that "[t]hose of ordinary skill were clearly enabled by the original specification to provide the claimed CVD apparatus given the wide recognition of distribution showerheads in the art" (App. Br. 8-9).

As for the related issue raised by the Examiner's new matter objection to Appellants' disclosure amendment, Appellants argue that "those of ordinary skill would appreciate that an option necessarily exists to accomplish the distribution shown in Fig. 1 using a conventional, optional distribution showerhead 104 shown in amended Fig. 1 and expressly described by amendment to the original specification" (App. Br. 10). Appellants argue that, under these circumstances, "regardless of Appellant's [sic] failure to expressly describe distribution showerhead 104 in the original specification and drawings, Appellant's [sic] addition of such feature does not constitute new matter" (*id.*).

These arguments are unpersuasive.

The deficiency of Appellants' new matter argument is that the record before us fails to establish that an artisan would have considered a

¹ Contrary to Appellants' apparent belief, the reference to Carpenter et al is not prior art with respect to the subject application and therefore does not evince what was known to those with ordinary skill at the time the here claimed invention was made.

conventional distribution showerhead to be the only mechanism capable of achieving the gas distribution shown in Figure 1 of Appellants' original drawing. Therefore, the fact that distribution showerheads were known in the prior art is inadequate, by itself, to establish that an artisan would perceive the Figure 1 gas distribution as necessarily achieved by a distribution showerhead. For all we know based on the record of this appeal, an artisan would have considered the Figure 1 distribution as achievable by any number of prior art mechanisms including the single orifice explicitly shown in Appellants' Figure 1.

For this reason, Appellants' original disclosure would not allow a person with ordinary skill in this art to recognize that they had invented the combination of a distribution showerhead and their apparatus, for example, as shown in original Figure 1. *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir.).

It follows that the "distribution showerhead" amendments to the drawing, specification, and claim 44 violate the new matter prohibition of 35 U.S.C. § 132 (with respect to the drawing and specification) as well as the written description requirement in the first paragraph of 35 U.S.C. § 112 (with respect to claim 44).

In addition, the "distribution showerhead" feature renders claim 44 non-enabled notwithstanding the Jeong reference evidence that distribution showerheads were used by those of ordinary skill in conventional CVD apparatus of the prior art. The rule that a specification need not disclose what was known in the prior art is merely a rule of supplementation, not a

substitute for a basic enabling disclosure. *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997). It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement. (*Id.*).

The "distribution showerhead" feature is a novel aspect of the claim 44 invention for a number of reasons.

First, the feature is a novel aspect simply because it was not described in the original disclosure as required by the first paragraph of § 112. The "distribution showerhead" also is a novel aspect of the claim 44 CVD apparatus because this apparatus includes an isolation mechanism in the form of the claimed opening and valve assembly. As previously explained, Appellants' Specification discloses that a conventional CVD apparatus would not include an isolation mechanism and therefore would require purging the supply line of process chemical (Spec. 10, first full para.). Thus, while a distribution showerhead was known for use in a conventional CVD apparatus, it was not known for use in a CVD apparatus of the type here claimed which includes an opening and valve assembly (i.e., isolation mechanism) that eliminate the need for purging of process chemical. Moreover, it is undisputed on this record that Appellants' Specification disclosure contains no teaching which would enable one skilled in the art to make and use a distribution showerhead in combination with the CVD apparatus disclosed and claimed by Appellants.

Indeed, such a combination appears to be incompatible with Appellants' disclosed goal of eliminating the purging of process chemical

from supply lines to avoid the unintended entry of chemical into the deposition chamber (Spec. para. bridging 5-6). This goal is achieved via an isolation mechanism at the inlet opening to the deposition chamber (Spec. para. bridging 9-10). The use of a distribution showerhead downstream from the opening and valve assembly (i.e., isolation mechanism) as required by claim 44 seemingly would result in the need to purge process chemical from the distribution showerhead (i.e., to avoid its unintended entry into the deposition chamber), thereby frustrating the goal of Appellants' invention.

It is, therefore, insufficient for Appellants to merely state that claim 44 would be enabled because distribution showerheads were known to those of ordinary skill for use in conventional CVD apparatus of the prior art. For this reason, substantial doubt exists as to whether one with ordinary skill in this art could practice the claim 44 invention without undue experimentation. *See Automotive Techs. Int'l. v. BMW of North Am.*, 501 F.3d 1274, 1282-84 (Fed. Cir. 2007).

For the above stated reasons, we affirm the § 112, first paragraph, rejection of claim 44 for failing to comply with the enablement requirement.

The § 102 and § 103 rejections based on Posa

Appellants disagree with the Examiner's finding that independent claims 41 and 46 are anticipated by Posa. According to Appellants, Posa contains no teaching of the here claimed single-piece lid having a thickness much less than its width and similar to a thickness of the deposition chamber cylindrical body (App. Br. 11-12; Reply Br. 2-4). We cannot agree.

Figures 4 and 5 of Posa display a lid in the form of manifold 300 whose thickness is shown as much less than its width (*see* especially Fig. 5). Likewise, these figures show the lid as similar to the thickness of the deposition chamber cylindrical body. Finally, we share the Examiner's finding that the cross hatching of the manifold or lid shown in Figures 4 and 5 evinces that the manifold or lid is a single-piece as required by the afore-noted claims. In this latter regard, Appellants seem to believe that the complexity of Posa's manifold indicates that it cannot be manufactured as a single-piece. However, the "single-piece" claim requirement encompasses a lid constructed of plural manufactured parts which are assembled into an ultimately single-piece structure of unified parts.

Under these circumstances, we affirm the § 102 and § 103 rejections based on Posa of claims 41 and 46 as well as dependent claim 42 which has not been separately argued. Likewise, we affirm the § 103 rejection of claim 43 as being unpatentable over Posa in view of Fukui since this dependent claims also has not been separately argued.

The § 102 and § 103 rejections based on Fukui

We agree with Appellants that Fukui contains no teaching or suggestion of the CVD apparatus defined by claim 1. This claim requires a deposition chamber defined by a lid and body having similar thicknesses and "a valve body having an entirety of a seat within the chamber lid or body thickness between the innermost and outermost surfaces of the chamber lid or body, the seat forming a part of the chamber lid or body."

According to the Examiner, Fukui's solution escape inhibitor or fence 14 reads on the here claimed chamber lid and body, and patentee's needle valve holder 7 reads on the here claimed valve body (Ans. 5-10, 18-19). As for the claim 1 requirement for a valve body seat within the lid body thickness and forming a part of the lid body, the Examiner believes that "Fukui's needle valve holder (7) and chamber [lid or body] (14) are part and parcel part of the same unitary structure" (Ans. 18-19). However, this belief is based on conjecture rather than evidence and is contrary to the Figure 1 depiction of Fukui's apparatus.

Moreover, the Examiner has given no persuasive reason why an artisan would have modified patentee's apparatus to thereby result in a valve body seat within the chamber lid thickness and forming part of the chamber lid as required by claim 1. In this regard, we point out that Fukui's fence 14 is merely a surrounding wall which performs the function of inhibiting the escape of atomized solution (col. 5, ll. 1-2 and 36-41). An artisan would not have been motivated by facilitation of this function or by any other reason proffered by the Examiner to perform the extreme modifications of Fukui's fence 14 and valve holder 7 which would be required to achieve the claim 1 apparatus.

For these reasons, we reverse (1) the § 102 and § 103 rejections based on Fukui of independent claim 1 and of claims 2 and 4-8 which depend therefrom as well as (2) the § 103 rejection based on Fukui of claims 3 and 37 which also depend from claim 1.

However, we cannot agree with the Appellants that Fukui fails to anticipate the apparatus defined by independent claims 9, 15, 27, and 46. Contrary to Appellants' belief (App. Br. 12-14; Reply Br. 4-6), Fukui teaches each of the argued features of these claims.

Specifically, Fukui's fence (i.e., lid) 14 is shown in Figure 1 as attached to and therefore integral with valve holder 7 (i.e., isolation mechanism) as required by claim 9.

We perceive no persuasive merit in the Appellants' unembellished argument that "fence 14 of Fukui does not disclose the deposition chamber defined as in claim 15" and that "needle valve holder 7 and wave sprayer 1 do not include fence 14 as part of the valve body" (App. Br. 14). For example, Fukui's fence (i.e., lid) 14 has a thickness which is much less than its width as required by claim 15. Similarly, patentee's valve body 7 may be fairly characterized as forming a part of the chamber lid (i.e., since it occupies a substantial portion of the top chamber surface) and accordingly satisfies the claim 15 requirement "a valve body including a portion of the lid as part of the valve body."

Analogous reasoning applies to claim 27. That is, because Fukui's valve body 7 may be fairly considered as forming part of the lid for patentee's deposition chamber, the housing of valve body 7 comprises a part of the outer surface of the lid as required by claim 27. Alternatively, the housing of Fukui's valve body 7 comprises a part of the opening sidewalls of patentee's fence (i.e., lid) 14 (i.e., at the attached intersection of body 7 and fence 14) in accordance with this claim.

Finally, regarding independent claim 46, Appellants argue that, "[a]s may be appreciated from the discussion above regarding the deficiencies of Fukui as applied to claims 1, 9, 15, and 27, Fukui also does not disclose or suggest every limitation of claim 46" (App. Br. 14). However, claim 46 does not contain the above discussed limitations which render claim 1 patentable over Fukui. Moreover, Appellants do not specifically identify any limitation in claim 46 which is thought to patentably distinguish over Fukui. Under these circumstances, Appellants have failed to reveal any error on the Examiner's part in rejecting this claim over Fukui.

In light of the foregoing, we affirm the § 102 and § 103 rejections based on Fukui of independent claims 9, 15, 27, and 46 as well as the claims which depend therefrom thereby resulting in affirmance of these rejections as to claims 9-23, 25-29, and 46. We also affirm the § 103 rejections of claims 38 and 40 over Fukui and of claim 24 over Fukui in view of Waterfield since these rejections have not been separately argued by Appellants.

However, we must reverse the § 103 rejection of claim 44 as being unpatentable over Fukui in view Jeong. According to the Examiner, "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to add Jeong's gas distribution showerhead to Fukui's deposition apparatus" (Ans. 12). This obviousness conclusion is not well taken. Fukui's apparatus is for forming superconductor thin film via an ultrasonic wave sprayer for spraying a solution onto a substrate (col. 1, ll. 10-15; col. 2, ll. 14-36). Jeong's showerhead for distributing gas would not

be capable of generating the ultrasonically-atomized solution spray desired by Fukui. Therefore, an artisan would not have combined Fukui and Jeong in the manner proposed by the Examiner.

Summary

The § 112, first paragraph, rejection of claim 44 has been affirmed.

The § 102 and § 103 rejections of claims 41, 42, and 46 over Posa have been affirmed.

The § 103 rejection of claim 43 over Posa in view of Fukui has been affirmed.

The § 102 and § 103 rejections of claims 1, 2, and 4-8 over Fukui have been reversed.

The § 103 rejection of claims 3 and 37 over Fukui has been reversed.

The § 102 and § 103 rejections of claims 9-23, 25-29, and 46 over Fukui have been affirmed.

The § 103 rejection of claims 38 and 40 over Fukui has been affirmed.

The § 103 rejection of claim 24 over Fukui in view of Waterfield has been affirmed.

The § 103 rejection of claim 44 over Fukui in view of Jeong has been reversed.

Remand

We remand this application to the Examiner for a determination as to whether independent claim 1 and the claims which depend therefrom are patentable over Posa.

As indicated previously in this Decision, Posa discloses a CVD apparatus comprising a deposition chamber defined by a lid in the form of manifold 300 and a chamber body 316 (Figs. 4-5). Patentee's manifold or lid contains valves (102, 104 in Fig. 4; unnumbered in Fig. 5), and the seats for these valves are located entirely within the manifold or lid and form a part of the manifold or lid as shown in Figures 4 and 5.

It appears, therefore, that the above described apparatus of Posa satisfies each of the limitations recited in claim 1.

Under these circumstances, the Examiner must respond to this Remand by providing the written record for this application with an explanation of why Posa does or does not render claim 1 and the claims which depend therefrom unpatentable under either 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a).

In order to avoid bifurcated prosecution of the appealed claims, the Examiner should defer action on this Remand until Appellants have exhausted or waived (e.g., via inaction) their remedies for rehearing (37 C.F.R. § 41.52) and/or appeal (35 U.S.C. §§ 141, 145) with respect to the rejections affirmed in this decision.

Conclusion

The decision of the Examiner is affirmed-in-part.

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The application is remanded to the Examiner.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

REMANDED

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